

BENCHMARKS

VOLUME 3 NUMBER 6

NORTH TEXAS STATE UNIVERSITY

JULY/AUG 1982

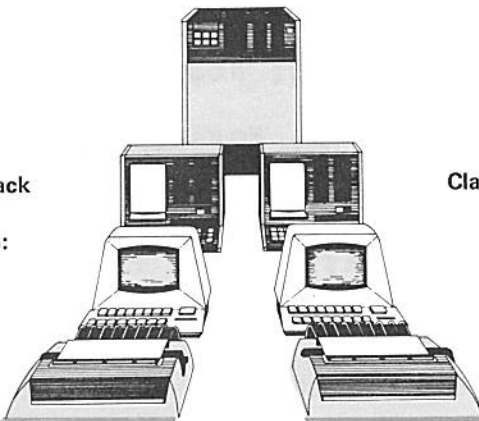
*BENCHMARKS was produced using Waterloo/SCRIPT

TABLE OF CONTENTS

1. SEMESTER BREAK HOURS	2
2. MUSIC AND THE HP GET NEW TELEPHONE NUMBERS	2
3. YOUR NUMBER IS UP.	2
4. ERROR ... ERROR ... ERROR	3
5. FALL COMPUTING CENTER WORKSHOPS AND SHORT COURSES	3
6. CENTER TO OFFER COURSES	4
7. TERMINAL ACQUISITIONS FOR NEW COMPUTING FACILITIES.	5
8. MICROCOMPUTER POLICY REMINDER	5
9. TUIT - A SYSTEM FOR THE ANALYSIS OF LITERARY AND TEXTUAL MATERIALS	6
10. USING THE COMPUTER FOR RESEARCH: PART V	6
11. MUSIC	20
Class ID's Cancelled	20
Renew Your ID-Code	20
Change That Password	20
12. HP-2000	21
Editing BASIC Programs	21
System Processing to Take Place August 28.	21
HP Short Course to be Offered.	22
HP User's Guide to be Available Soon	22
13. BENCHMARKS REVISITED: IMPORTANT ITEMS FROM THE PAST	22
14. COMPUTER HUMOR.	33
More Babbage	33
15. REGISTRATION FORM FOR COMPUTING CENTER SHORT COURSES.	35

BENCHMARKS Reader/User feedback
is encouraged.

Send all letters, suggestions, etc., to:
North Texas State University
The Computing Center
NT Station, Box 13495
Denton, Texas 76203



Claudia Putnam, BENCHMARKS Editor

Richard Harris,
Director of Computer Systems

Thomas Madron, Manager,
Academic Computing Services

Services Available To Users Of The NTSU Computing Facilities

All people mentioned below may be contacted by calling
(817) 565-2324:

Information and Project Numbers- Sue Heffley in the Computing
Center Reception Area, ISB 119.

Test Scoring and Analysis - Sue Heffley.

Newsletter Questions/Contributions/etc. - Claudia Putnam.

Statistical/Research Support (provided for graduate students
and faculty members) - Bob Brookshire, George Morrow,
Claudia Putnam, and Mohamad Salahshoor.

Non-Research Student Programming Problems - student consultants
from the Computer Science Department, found in ISB 134A
near dispatch and the user keypunch area. Student
consulting provided by the College of Business is
available at the BA Computing Access Facility.

JCL and Debugging Problems - Mohamad Salahshour.

Pre-Research Counseling, Including Survey Instrument Design -
Bob Brookshire, George Morrow, and Claudia Putnam.

Data Entry to MUSIC, Keypunch Requests and Questions Regarding
Layout of Keypunch Sheets; Interpreting - Betty Grise,
ISB 227.

Academic Timesharing Information and/or Problems HP/2000 and
AS/5000 MUSIC (McGill University System for Interactive
Computing) information and problems, including terminal
problems - Mohamad Salahshour.

Administrative Applications - Coy Hoggard.

AS/5000 Computer Hardware/Software/Billing Problems - Sandy
Franklin.

JOB Submission and Retrieval - RJE Operators.

Fall Computing Hours

Computing facilities will be open during the following times
throughout the Fall semester (not applicable to holidays):

Computing Center RJE: 7 AM-4 AM, Monday-Friday; 8 AM-MN
Saturday; Noon-MN Sunday.

College of Business RJE: 8 AM-MN, Monday-Saturday; Noon-MN
Sunday.

Media Library (GAB): 8 AM-MN, Monday-Thursday; 8 AM-6 PM
Friday; 11 AM-5 PM Saturday; 4 PM-10 PM
Sunday.

SEMESTER BREAK HOURS

The following hours will be in effect from August 14 to August 29:

Computing Center RJE: OPEN 8 AM - Midnight, Monday - Saturday;
 CLOSED Sunday August 15 & 22;
 OPEN Noon - Midnight Sunday August 29.

College of Business RJE: CLOSED Midnight, Friday August 13,
 REOPENS 8 AM August 30.

Media Library: OPEN 8 AM - 5 PM Monday - Friday.

MUSIC AND THE HP GET NEW TELEPHONE NUMBERS

The HP-2000 and MUSIC now have new telephone numbers, as was announced in the last issue of BENCHMARKS (June 1982). The numbers are:

HP-2000 565-3300

MUSIC 565-3499

All telephones on campus that belong to the Computing Center and will be used to access the interactive computer systems may not be used to dial off campus. To dial MUSIC or the HP while on campus, simply dial the last four digits of the telephone number.

YOUR NUMBER IS UP

Traditionally, here at the Computing Center, August is the month for renewal. All AS/5000 project numbers and HP/2000 ID-codes expire on midnight August 31. To maintain/regain access to either computer system, fill out a "NTSU Computing Center Project Number Request Form" and/or a "NTSU Computing Center Timesharing Service ID Code Renewal Form," available at the reception area of the Computing Center (ISB 119).

MUSIC ID-codes will also expire. See the MUSIC section of this newsletter (page 20) for further information.

ERROR ... ERROR ... ERROR ...

The following corrections need to be made to BENCHMARKS, Volume 3, Number 5, June 1982:

1. On page 4 ("Report on Computing Facilities Planning"), the schedule calls for the completion of the 5th floor GAB around February 15 1983, not 1982 as reported. According to Tom Madron, Manager of Academic Computing, however, we really would like to have it done yesterday.
2. On the top of page 12, in Figure 4 of the "Technical Notes on Repeated Measures Designs in SPSS MANOVA," the "VARIATES" should be PREVPOST and the "NOT USED" should be OVERALL.
3. In "Using Tapes With SAS," page 22, the unit should normally be TAPE9.. TAPEDD is only used in those extremely rare cases that require processing of 800 BPI tapes.

FALL COMPUTING CENTER WORKSHOPS AND SHORT COURSES

If you intend to use the Computing facilities for Research/Instructional or word processing projects, the Computing Center is offering the following short courses for your benefit.

The course schedule is as follows:

Introduction to Computing Center Facilities

<WH 322> Monday September 20, 1982, from 1-3 PM.
Provides a general introduction to
computing facilities here at NTSU.
INSTRUCTOR: Tom Madron

Introduction to MUSIC

<WH 222> Monday September 20, 1982, from 3-5 PM.
Good for those who wish to learn the
interactive computing system here at
NTSU. INSTRUCTOR: Tom Madron.

Introduction to SPSS

<WH 212> Tuesday/Thursday September 21/23 from
7-9 PM. A general purpose statistical
package especially good for social
science data. INSTRUCTOR: Bob Brookshire.

Introduction to SAS

<WH 216> Tuesday/Thursday September 21/23 from
3-5 PM. General purpose statistical
package with many other capabilities.
INSTRUCTOR: Claudia Putnam

Introduction to HP/2000 Tuesday September 21, from 3-5 PM
 <WH 222> Provides a general introduction to the facilities available on the HP/2000 minicomputer. INSTRUCTOR: Jeff Brooks

Introduction to MUSIC/SCRIPT
 <WH 222> Wednesday, September 22 from 3-5 PM.
 Good for those who wish to utilize the computer to do word processing. INSTRUCTOR: Claudia Putnam

Interpretation of NTSU Test Scoring Program
 <WH 322> Wednesday, September 22 from 1-3 PM.
 Good for those who use ST033, the program used to score tests recorded on test scoring forms. INSTRUCTOR: George Morrow

Advanced Topics in MUSIC Thursday September 23 from 3-5 p.m.
 <WH 322> Advanced usage of MUSIC NOT including MUSIC/SCRIPT.
 INSTRUCTOR: Mohamad Salahshoor

Advanced Statistical Packages
 <WH 322> Friday September 24, from 3-5 PM. An integrated look at SPSS, SAS, and BMDP. Participants should have a working knowledge of at least one of these packages. INSTRUCTORS: Bob Brookshire, Claudia Putnam

CENTER TO OFFER COURSES

The Center for Community Services is offering the following computer-related courses in the Fall:

Buying A Home Computer: Thomas Madron, Manager of Academic Computing Services, NTSU. This will be a session devoted to the kinds of considerations necessary when selecting a microcomputer for the home or office. COST: \$6 (Limit: 30).
 Thursday, September 16,
 7 - 9 PM, <ISB 231>

Introduction to the Home Computer:
 Sec. 1 - Tu/Th, Sept. 14, Layne Wallace, Computer Science Consultant,
 7:30-9:30 PM <GAB 318> NTSU. Introducing the ways to use the home computer (microcomputer). COST: \$10
 Sec. 2 - TU/TH, Sept. 21, (Limit: 30). Section 1 - no knowledge;
 7:30-9:30 PM <GAB 318> Section 2 - some knowledge.

Call (817) 565-2656 for more information on these courses.

TERMINAL ACQUISITIONS FOR NEW COMPUTING FACILITIES

With the installation of new computing facilities in the fifth floor of the General Academic Building, some alterations in the terminals being acquired by departments may be in order. The new facility will have, in addition to a larger IBM or IBM compatible system, two public access Digital Equipment Corporation (DEC) VAX 780 computers for non-IBM timesharing.

The VAX 780's will have many features various users will wish to use. Among those features are the possibility of full screen text editing. Software other than text editors can also make use of full screen capabilities. Just as IBM systems operate with full screen capabilities using a specialized terminal (a 3270), so do DEC machines operate best using specialized DEC or DEC compatible terminals. Those terminals are the VT100 series. Consequently, for those departments wishing to use the full screen capabilities of the VAX 780s, any new terminals acquired should emulate VT100s.

Consistent with the advice just given is the effort the Computing Center is making to provide 3270 emulation for a variety of terminals on the IBM compatible equipment. In fact, it is our objective to begin providing this service as of the beginning of the Fall semester, 1982. Virtually all existing terminals will be able to use the 3270 emulation for full screen editing on the AS/5000. In the event that a department acquires new terminals which emulate VT100s, then it would be possible to do full screen editing on both the DEC and the IBM oriented equipment. All current terminals (except the IBM 3270s and the TELEX 277s) will be able to access all machines, of course, but not all terminals currently on the campus will be able to make full use of some software features unless they can emulate the VT100s.

MICROCOMPUTER POLICY REMINDER

Just a reminder to those people and departments wishing to acquire microcomputers. Current university policy requires that the Computing Center review plans being made for microcomputer applications. This is not a rubber stamp process. The purpose of the policy is to ensure that departments acquire systems which are compatible with current university computing policy and to ensure that departments are acquiring machines which will actually fulfill the purposes for which they are acquired.

It is important for potential purchasers of microcomputer equipment to consult with the Computing Center generally, and the Manager of Academic Computing (Tom Madron) in particular, in the planning stage of a proposed acquisition--not at the end of the process. Early consultation can save time, effort, and money, and provide a means for acquiring equipment in an orderly fashion. The guidelines necessary for the acquisition of microcomputers can be acquired from either the Purchasing Office or the Computing Center.

TUIT - A SYSTEM FOR THE ANALYSIS OF LITERARY AND TEXTUAL MATERIALS

A new software package--TUIT-- is now available to users of the NTSU computing services. TUIT is designed to assist in the analysis of literary and textual data. It's capabilities include the production of KWIC and KWOC indexes; counts of words, sentences, syllables and the like; frequency distributions of words; and a variety of readability indexes. If you would like more information on TUIT, please call Academic Computing at (817) 565-2324.

USING THE COMPUTER FOR RESEARCH: PART V By Bob Brookshire

This article is the fifth in a series of articles on computing and data analysis. The previous articles appeared in BENCHMARKS Volume 3, Numbers 2, 3, 4, and 5.

Introduction to Statistical Packages

A statistical package is a generic term that refers to a set of computer programs to perform statistical analyses which use a common set of instructions. These packages generally also include programs which can edit data, select cases for analysis, and compute new variables based on values of existing variables. They require you to provide sets of statements which describe the organization of the data to be analyzed, and other commands which specify the desired types of analyses.

Statistical packages represent a great leap forward from the unorganized, ad hoc, programs which were used when computers first became widely available for academic research. They provide access to a wide variety of commonly used statistical procedures, as well as to more specialized methods. The accuracy of the computations performed by these programs has been well established, and their use is common in most disciplines where empirical research is practiced.

The use of statistical packages has many advantages. Most of them do not require any knowledge of computer programming. Many of these packages are available at almost every institution of higher learning, and the instructions specific to the packages do not vary from location to location, permitting you not only to replicate the research of others, but to continue your projects after a change of institutional affiliation. You can use these packages for only the cost of the computer processing, and do not need to pay a computer programmer to devise analysis routines. The authors of the statistical packages have made great efforts to thoroughly explain and document the use of their programs in the manuals which accompany the packages, and have tried to keep the program instructions in language that is as close to standard English as is practical.

Once you become familiar with the basic commands of a statistical package, it is not hard to conduct a large number and variety of analyses with only a few changes in the set of program commands. In addition, knowledge of one statistical package makes learning how to use other packages quick and easy.

Naturally, the use of statistical packages is not without its limitations. Some statistical procedures are not available in some packages, while others may be in a format unfamiliar to the user. Even though the commands necessary to do analysis with these programs are greatly simplified, compared to normal computer programming, it still may require many program statements to adequately describe a large data set with many variables and transformations. Some of the programs have limitations on the number of variables or cases that can be processed. Finally, some of the most advanced statistical procedures cannot be found in any statistical package.

Statistical packages have many features in common. Each must have, as mentioned above, a set of instructions which describe the data to be analyzed, including names for each of the variables and the columns of the data matrix they occupy. An additional set of instructions is necessary to describe the statistical procedure to be used. Most packages allow the user to perform more than one analysis in a single run, or computer job.

In spite of these similarities, however, statistical packages have many important differences. Some are quite rigid in the format required for commands, while others are very flexible. Some require a lot of job control language, others do not. A few packages provide programs to do a variety of nonstatistical procedures, such as report writing, while others are purely statistical. As with any other product, some packages are more useful in certain applications than others. Some perform best with small data sets, or contain only a few generally applicable statistical procedures. Some packages attempt to provide procedures of interest to nearly all disciplines, and are capable of handling data matrices of virtually unlimited size. You may find that, in order to get the best analysis of your data, you must use more than one statistical package. Several packages contain programs that prepare the results of data analysis for input to another package, so that this use of multiple packages is made easier.

Interactive and Batch Processing

As mentioned above in the discussion of operating systems, some packages are available on the interactive operating system, MUSIC, while others are supervised by the batch operating system, OS/MVT. With a statistical package on an interactive system, you enter a single command, the program responds, you enter another command, and so on, with a sort of dialogue or conversation taking place between you and the computer. Interactive programs usually include prompts, or questions asked by the

computer, which guide you to select the appropriate responses or commands. Interactive programs also include menus, lists of possible commands or responses from which you may choose, and help files, which you can read while running the program to get further information or instructions on the use of the program.

With programs operating under a batch system, you submit a series of commands to the program, which it processes in one job, printing the results of all these steps at one time, rather than responding to one command at a time. No prompts or help files are provided. Rather, instructions are provided in documentation or user's guides obtainable from commercial publishers or the Computing Center.

The trend in computing seems to be more and more toward making programs interactive. An interactive version of one statistical package, SCSS, is already available at some locations, and the statistical packages SAS and BMDP are run interactively at some institutions. Unfortunately, these facilities are not yet available for the major operating systems here at North Texas. It is not a matter of the University not having the willingness or resources to acquire these programs, but that they are not being produced in a format that we can use on our computer system. The Computing Center is now attempting to adapt several statistical packages from batch to interactive processing, and these versions may be available later this year.

Before going into detailed descriptions of each package available at North Texas, there are two final, nonstatistical issues which affect the usage of all statistical packages which should be discussed. As mentioned, batch programs require some job control language (JCL) to instruct the computer in the use of the package. In addition, you must make a choice between using computer terminals or punched cards as the major means of communication between the analyst and the computer. The next two sections will present brief overviews of these issues.

Job Control Language

For the purposes of the user of statistical packages, job control language serves three major functions:

1. It provides accounting and labelling information so that the Computing Center can keep track of the program results (output) and charges for computer usage;
2. It tells the computer which statistical package you want to use, and any special instructions regarding its use; and
3. It passes information to the statistical package about the location of any data sets you have stored on disk or tape that it must use.

Each of these functions is handled by a separate job control language statement.

Job control language statements¹ have two important characteristics in common. First, they always start with two slashes, or diagonals (//). Second, JCL statements may not have more than 71 characters on one line of the statement. Therefore, if you have more than 71 characters of information to transmit, you must continue the statement on a new line. A statement that is continued on the next line will always end with a comma, and a continuation of a statement will always start with two slashes and a space (//). Examples of JCL statements are provided after the discussions of each type.

The JOB Statement

The JOB statement provides the computer's accounting programs and the computer operator with information about your data analysis job. As with all JCL statements, it starts with two slashes. Immediately following the slashes is a job name of up to eight letters that you provide. Since there cannot be two jobs in the computer system with the same name at the same time (the operator will cancel them if this occurs), the name you select should be fairly original or unique. One way to insure this might be to include your initials as part of the name, (e.g. RGBRUN) or some other combination of letters that is unusual. (Warning: Some computer operators will cancel jobs with names they find insulting or obscene.) Leave a space after the job name, and then enter the word JOB, followed by another space.

Next, put a left parenthesis followed immediately by your OS project number. After the project number, you may enter a comma, followed by an estimate of the number of minutes of computer processing you think the job will take, and the amount of lines, in thousands, that you expect will be output. After these estimates, put a right parenthesis. You may, if you wish, omit the estimates of time and lines, and simply close the parentheses after your project number. In this case, the system will supply an estimate of one minute and two thousand lines of output for you. If your job exceeds the estimated time or lines, it will be cancelled. Accurately estimating the time and lines for a job is something of an art, and depends on the number of cases, the number of variables, and the complexity of the statistical procedure in your analysis. It is almost always safe to overestimate these requirements, so guess

¹ Job control language differs radically with the type of computer, and from installation to installation of the same computer. The following description applies to North Texas State University only. Other institutions with IBM computers or operating systems may have some similarities. Other types of computers or operating systems may be quite different. The general functions of JCL are the same regardless of its form, however.

generously. After some experience, you will be able to fine tune your estimates.

Following the right parenthesis, enter a comma, and then your last name enclosed in single quotation marks, or apostrophes ('). Enter another comma, and then the expression CLASS=A if your data matrix is on magnetic disk or punched cards, or CLASS=B if your data resides on magnetic tape. The following example shows that the JOB statement is not really as complicated as the verbal description indicates.

Example JOB Statement

```
//RGBRUN JOB (1234-5678,:30,2),'BROOKSHIRE',CLASS=A
```

In the example above, the job name is RGBRUN, the OS project number is 1234-5678, the estimated time that the job will take is 30 seconds (a generous estimate), and the number of printed lines of output is expected to be less than 2,000. The name of the researcher is Brookshire, and the job is CLASS=A, since the analysis does not require the use of a tape. Further information on the JOB statement and its parameters can be obtained in back issues of "Benchmarks," and in the user's guide Using OS/MVT.

The EXEC Statement

The EXEC statement tells the computer which statistical package you want to use, and may provide additional information about the use of the package. Like the JOB statement, it starts with two slashes. After these characters, you may put a step name of up to eight characters. This is rarely necessary, however, and one to eight blank spaces may be used instead. Next follows the word EXEC, a space, and then the name of the statistical package you will be using (for BMDP, use the word BIMED as the package name). This is all that will normally be required in the EXEC statement if you are using the SAS, SPSS, and OSIRIS statistical packages. BMDP users need to follow the word BIMED with a comma, and then the statement PROG=BMDPxx, where xx is the name of the BMDP subprogram you will be using.

If you have a fairly large data set, or are using a statistical procedure that requires an especially complex series of computations, you may need to add another parameter to the EXEC card. The REGION= statement allocates an additional amount of computer memory for the processing of your job. Memory is allocated in blocks of 1024 bytes, or 1K. Most statistical packages routinely allocate several hundred K (several hundred thousand bytes) of memory; occasionally, you may need more than this. Up

to 512K may be used for a statistical analysis without any special handling being required for the job by the computer operator. If you need more than this, you should consult someone in Academic Computing about the special procedures for handling these large jobs. For most analyses, however, the region parameter can be omitted.

Examples of EXEC Statements

```
// EXEC SPSS  
//STEP1 EXEC BIMED,PROG=BMDP2R  
//      EXEC SAS,REGION=356K
```

The above table shows some examples of EXEC statements. In the first example, no step name is used, and no parameters are given for the statement. The program SPSS is simply executed. In the second statement, the step name STEP1 is used, and the BMDP program 2R, stepwise regression, is executed. No other parameters are given. In the third example, no step name is used, and a few more blank spaces appear after the slashes, which is permissible. The program SAS is executed, and 356K of memory is allocated for the program. Further information on the EXEC statement is available in the reference at the end of this section on job control language, in "Benchmarks," and in the user's guide Using OS/MVT.

The DD Statement

The third type of job control language statement of interest to users of statistical packages is the DD statement. The letters DD stand for "data definition," as the function of this statement is to define the data set(s) that will be used for the analysis. More than one DD statement may be required if more than one data set is used. The parameters of the DD statement are somewhat complex. If you pay careful attention to the discussion and the examples, you should be able to avoid many of the errors that are commonly made in using this statement.

The DD statement begins, of course, with two slashes. Following the slashes is a ddname, which will depend on the requirements of the statistical package you are using. This name may be a word, such as DATA1, or a series of numbers and letters, such as FT08F001. Again, these names will differ depending on the statistical program. The purpose of this ddname is to direct the program to the appropriate statement in the job control language where the data set is described. Further information on ddnames is provided in the user's manuals for the statistical packages, and in the more detailed discussion of the packages provided below.

The ddname is followed by a space, and then the letters DD. Next comes another space, and then the description of the data set. These parameters can be in any order. The order of the ddname and the letters DD cannot be changed.

The most important of the data description parameters is the DSN=data set name. Each data set that is stored on disk, and many that are stored on tape, have unique names by which they are identified. At North Texas, the Computing Center has established a naming convention for disk data sets. These names are prefixed by the words RSRCH., USER1., or USER2., depending on whether the owner of the data set is a faculty member or student, and whether the research is supported by a research grant. The next parts of the name take the form Dxxxx.Pyyyy., where xxxx-yyyy is the OS project number of the data set owner. Following these prefixes is some name, defined by the owner, which describes the data set. The name may be more than one word long, with each word separated by a period, but each word in the name may not be longer than eight characters, and the words may not start with numbers. RSRCH.D1234.P5678.DENTON.DATA is a valid data set name, as is USER2.D9876.P5432.THEISIS. RSRCH.FRED or USER2.D7654.P3210.1980DATA are not valid. The parameters which would describe the two valid data set names above would be DSN=RSRCH.D1234.P5678.DENTON.DATA and DSN=USER2.D9876.P5432.THEISIS. You should be very careful when naming your data sets. Data sets which do not conform to the naming convention will be erased by the Computing Center. Two data sets with the same name may not exist on the same magnetic disk. More information on the naming convention is available in "Benchmarks," and in the user's guide Using OS/MVT.

After you give the name of the data set, you must describe the location of the data set, on disk or tape. This is accomplished through the UNIT= parameter. If the data is on disk, the appropriate parameter is UNIT=SYSDA. If the data is on nine track tape, the parameter should be UNIT=TAPE9. (If you have a tape that is not nine track, consult Academic Computing.) Next, you should give the name of the disk or tape with the VOL=SER= parameter. Three disks are available for storing research data sets, named ACAD00, ACAD01 and ACAD02. ACAD01 is for the use of the College of Business, ACAD00 for those with funded research, and ACAD02 for all others. If your data are on tape, give the name or number of the tape.

Data files on tapes require some additional descriptive information. Files on tapes are stored sequentially, one after another, and therefore have a number that describes their location. That is, the first file on the tape is file number 1, the second 2, and so on. In addition, tapes may or may not be created with labels that provide information about the contents of the tape. The LABEL= parameter gives OS/MVT this information about your tape. If, for instance, your data is located in the first file on a tape that has IBM standard labels, you would use LABEL=(1,SL) as the parameter in the DD statement for the data set. If you want the third data file on a tape with no labels, use LABEL=(3,NL). If you are unsure about the labelling of your tape, or the location of the file on the tape, you can use the TAPELABEL procedure in the SAS statistical package to get this information. This procedure is described in detail in the SAS User's Guide.

The next parameter that is needed to describe the data, whether on tape or disk, is the DISP (disposition) of the data file. If you are using a data set that has been previously created, this parameter is DISP=(OLD,KEEP) to indicate that the data set should be kept after the program is through with it. If it is a new data set being created for the first time, as with an SPSS system file or BMDP save file (see below), this parameter should be DISP=(NEW,KEEP,DELETE), which tells OS/MVT that this is a new file, and it should be kept if the program runs successfully and deleted if it fails.

DD statements have other uses besides describing data sets used for statistical analysis. They can also be used to control the punching of cards, the printing of program results, and other characteristics of programs. Other types of DD statements will be described in the more detailed discussions of the statistical packages, and in the Appendix, which describes some IBM utility programs that are particularly useful to researchers. One final DD statement is important for user's of statistical packages. This statement has the ddname SYSIN, and tells OS/MVT that the language that follows this DD statement is the program control language for the statistical package, and not further OS/MVT commands. Its format is:

```
//SYSIN DD *
```

This is all the job control language that will normally be needed by users of statistical packages, with the exception of some special commands that are unique to the particular programs, and will be described in the discussion of these programs. The following table shows the use of the JOB, EXEC and DD statements for statistical programs that use

1. A data set that was previously created on disk by another program,
2. A data set that resides on tape, and
3. A data matrix that is included with the program control statements..

In the first example, the job name is JPJRUN, the project number is 1211-3452, and the user has estimated that his job will take 10 seconds and will print no more than 1,000 lines of results. The name of the researcher is J. P. Jones, and the job is CLASS=A, since it requires no tapes. The EXEC statement shows that he wishes to use the statistical package SPSS. The first DD statement has the ddname FT08F001, which is required by the SPSS program, and directs SPSS to the data set with the name USER1.D1211.P3452.SHIPPING.DATA, which is located on the magnetic disk ACAD01. The second DD statement tells OS/MVT that the rest of the commands will be SPSS commands, not OS/MVT commands.

Example Job Control Language

```
//JPJSTAT JOB (1211-3452,:10,1),'JONES J P',CLASS=A
//      EXEC SPSS
//FT08F001 DD DSN=USER1.D1211.P3452.SHIPPING.DATA,
//      UNIT=SYSDA,VOL=SER=ACAD01,DISP=(OLD,KEEP)
//SYSIN DD *
(SPSS program statements begin here)

//FORMPRES JOB (1976-1980,:30,3),'CARTER, J',CLASS=B
//      EXEC SAS,REGION=350K
//DATA1 DD DSN=PEANUT.WARE.HOUSE.INFO,UNIT=TAPE9,
//      VOL=SER=JECTAPE,LABEL=(5,SL),DISP=(OLD,KEEP)
//SYSIN DD *
(SAS program statements begin here)

//ASTRORUN JOB (2001-2001,:15,1),'SAGAN, CARL',CLASS=A
//      EXEC BIMED,PROG=BMDP1L
//SYSIN DD *
(BMDP program statements begin here)
```

The second example has the job name FORMPRES, the project number 1976-1980, the estimates of the time and lines are 30 seconds and 3,000 lines, the programmer is J. Carter, and the job is CLASS=B, since it requires a tape. The program to be executed is SAS, and 350K of memory has been requested. The first DD statement has the ddname DATA1. It directs the SAS program to the file PEANUT.WARE.HOUSE.INFO, which is located on the nine track tape JECTAPE. (This file does not have to conform to the NTSU naming convention, since it is on a tape.) The data is the fifth file on a tape with IBM standard labels. The second DD statement signals the end of the job control language and the beginning of the SAS program statements.

In the third example, Carl Sagan is including the data to be analyzed by the BMDP statistical package with the program statements, either on cards or as a MUSIC data file. He therefore does not need a DD statement to describe the data. His job name is ASTRORUN, his project number is 2001-2001, he estimates that it will take 15 seconds, and print 1,000 lines, and, since the job does not use a tape, it is CLASS=A. The EXEC statement calls for the BMDP program 1L, life tables and survival analysis. The only DD statement needed is the SYSIN DD statement.

Terminal or Cards?

As mentioned previously, most of the statistical packages available at NTSU are supervised by the OS/MVT operating system, and can be accessed by entering the appropriate JCL commands and program control information on punched cards. The information on these cards is transmitted to the computer through a card reader. Alternatively, JCL and program control commands can be typed on a terminal supervised by the MUSIC operating system, stored in disk files under MUSIC, and then transmitted to the OS/MVT system for processing. The decision on which method to use is up to you.

If you have never used a computer before, you may find it more convenient to use the terminal to communicate with the system. Beginners make a lot of mistakes when learning to use the computer, and the ability to see your commands on the video screen and edit them quickly helps make the recovery from these errors easier. In addition, the MUSIC operating system contains instructional programs and help files which can answer questions you may have about using the system. Punching cards requires the use of a keypunch machine, which some people (myself included) find extraordinarily difficult.

On the other hand, comprehending the use of two different operating systems and editing commands in addition to the requirements of the statistical package may prove to be too complicated for some people. Those who have always used punched cards for programming and research may see no need to change the procedures with which they are comfortable. Some may find using the terminal more difficult than using a keypunch.

The choice of method is up to you. North Texas State, like many schools and businesses, has facilities for both terminal and card communication. Be aware, however, that some institutions do not have terminals, and some do not have facilities for reading cards (although, as mentioned, the trend seems toward increasing the use of terminals). The ideal situation is to be familiar with both media, but this goal may not be practical for all researchers.

Using OSJE

If you decide to use a terminal, you need to know how to use the OSJE (OS Job Entry) and OSJR (OS Job Retrieval) programs to submit your programs from MUSIC, the terminal operating system, to OS/MVT, the operating system on which most of the statistical packages reside. For most applications, the use of OSJE merely requires the addition of two statements to the job control language of the program. The file which contains the program control information for the statistical package and the OS/MVT job control language should have, as its first record or line, the statement /INC OSJE. This statement tells MUSIC to INCLUDE the OS Job Entry

program as part of the file, so that your program will be submitted to the OS/MVT system instead of being processed entirely by MUSIC. The statement which follows /INC OSJE should contain SYSTEM='OS', TYPE='type', and, optionally, RETURN. The phrase SYSTEM='OS' tells the OSJE program that the job should be submitted to the OS/MVT operating system (rather than one of the other operating systems). The phrase TYPE= should be completed with 'STUDENT' or 'FACULTY' depending on your classification. The phrase RETURN tells OSJE to return the output of the program to the OSJR facility so that it can be examined before being printed. If you want the results printed immediately after the program finishes execution, simply omit this phrase.

There is one addition wrinkle added to the JCL when using OSJE. In order for OSJE to keep track of your job among the mass of jobs being submitted, both from MUSIC and OS/MVT, you are required to use the first four characters of your MUSIC user identification code as the first four characters in your job name (on the JOB job control language statement). The last one to four characters can be anything you wish. The following table contains two examples of the use of OSJE commands in statistical programs.

Examples of OSJE Commands to Submit Jobs to OS/MVT

```
/INC OSJE
SYSTEM='OS',TYPE='STUDENT',RETURN
//WW99BMDP JOB (9876-5432),'ARMSTRONG',CLASS=A
// EXEC BIMED,PROG=BMDP1V
//FT09F001 DD DSN=USER2.D9876.P5432.SPACE,UNIT=SYSDA,
// VOL=SER=ACAD02,DISP=(OLD,KEEP)
//SYSIN DD *
(BMDP program control statements start here)
```

```
/INC OSJE
SYSTEM='OS',TYPE='FACULTY'
//XX34TEST JOB (5544-6677,10,1),'FISHER',CLASS=A
// EXEC SPSS,REGION=356K
//SYSIN DD *
(SPSS program control statements begin here)
```

In the first example, Armstrong has added the two required statements to his job control language. We can see that he is a student, and that he wants the output of the program returned to OSJR before it is printed. Examining the other JCL statements, we note that the first four letters of the job name are WW99, which must be the first four letters of his MUSIC id code. His OS/MVT project number is 9876-5432. He has not put any estimates for the time and lines of output for the job, so he will be assigned a maximum of one minute and 2,000 lines by the system. His job

is CLASS=A, since he does not use a tape drive. The EXEC statement shows that he wants to use the BMDP program 1V, which does simple analysis of variance. His data is described in a DD statement with the ddname FT09F001, and is located on the magnetic disk ACAD02, in a file with the name USER2.D9876.P5432.SPACE.

In the second example, Professor Fisher has omitted the phrase RETURN from the parameters of the OSJE statements. This indicates that he wants the results of his analysis printed immediately, not returned to the OSJR program. The TYPE parameter shows that he is a faculty member. His JOB card shows that the first four characters of his MUSIC id code are XX34, since these are the first four characters in the job name. His OS/MVT project number is 5544-6677, and he has estimated that his job will take no more than 10 seconds, and print no more than 1,000 lines. Note that there is no DD statement to describe his data set. We infer from this that his data is included in the program control statements. His EXEC statement calls for the statistical package SPSS, and allocates 356K of storage for the problem.

Using OSJR

After you have submitted a job from MUSIC to OS/MVT, you can monitor its progress and examine its output with the OSJR (OS Job Retrieval) program. To initiate this program, simply type EXEC OSJR in MUSIC, and a carriage return (or "enter"). The program will print a message showing the job name, a job number which has been assigned to it by the system, and its status. Most commonly, the status of your job will be "waiting to run," "running" or "output ready for MUSIC." You can continue to follow the progress of the job by issuing the command STATUS (or ST). When the output of the job is ready for MUSIC, you can look at it by issuing the command OUT,DSID=ALL. If you want to print the output on the system line printer, issue the command ROUTE.

Provided that each job has a different job name, you can enter more than one program at a time for processing by OS/MVT. In this case, you can check any one of the jobs by adding the phrase JOB=nn to the STATUS, OUT or ROUTE commands, where nn is the job number assigned by the system. If you need help issuing a command in the OSJR program, the command HELP will provide you with further information. The OSJR program has many features that have not been described here, which are explained in the MUSIC User's Guide and by the HELP command.

The Example Data Set

The next articles in this series present explanations and examples of the use of several popular statistical packages. In order to more clearly illustrate the programs, I will use the same set of data and the same statistical procedures in the examples for each of the statistical packages. This will enable you to see the differences between the packages

easily, without confusing the differences between the packages with differences between sets of data or procedures.

The illustrative data is a set of test scores and characteristics of 20 students in a Research Methods class. There are 10 males and 10 females, and three test scores. The data, as it might be recorded in a teacher's grade book, is presented in the following table.

Data Used in Examples of Statistical Packages

Student	Sex	Test 1	Test 2	Test 3
Angstrom, Arnold	M	80	90	66
Black, Betsy	F	84	93	78
Chou, Andrew	M	80	81	60
Davis, Diane	F	72	88	80
Ellington, Elliot	M	84	91	90
Franz, Felicia	F	80	88	78
Granger, Georgette	F	68	83	70
Hammacher, Henry	M	94	89	86
Ito, Ignatius	M	82	94	86
Jimenez, Juanita	F	88	91	82
Klemmer, Kathy	F	84	95	80
Lupon, Linda	F	78	81	90
Meyer, Moshe	M	72	80	90
Nagy, Natasha	F	74	88	78
Oppendorfer, Olive	F	82	93	84
Peters, Preston	M	84	95	98
Quartermain, Quincy	M	0	0	0
Rosetti, Roberto	M	86	84	94
Stern, Sonja	F	82	98	94
Torrejón, Thomas	M	84	90	78

This is not the best format for the data to have in order to be processed by the computer, however. Instead of using the student's names as data, I will assign them a number based on their alphabetical order, and I will make the data as compact as possible by deleting all unnecessary blank spaces. The data will then be in a form suitable for storage on magnetic disk or tape, or for punching onto cards. The following table shows this format for the data.

Example Data as it Would be Coded for Storage

```
01M809066
02F849378
03M808160
04F728880
05M849190
06F808878
07F688370
08M948986
09M829486
10F889182
11F849580
12F788190
13M728090
14F748878
15F829384
16M849598
17M 0 0 0
18M868494
19F829894
20M849078
```

Note that we have lost very little information, even though the data is in a much more compact form. The only information missing from this data matrix that is in the grade role above is the names of the students, which I could preserve in my codebook for the data. Columns 1 and 2 of the data matrix contain the identification number for the students, column 3 contains the gender code, columns 4 and 5 contain the scores for Test 1, 6 and 7 the scores for Test 2, and 8 and 9 the scores for Test 3. This information on the column locations of the variables, and whether the variables are coded as numbers or alphabet characters, must be passed to the statistical packages. Now we are ready to write the program control statements which will direct the statistical packages to perform statistical analyses of the data, a topic which will be covered in the next articles in this series.

References

- Ashley, Ruth and Fernandez, Judi N. - Job Control Language. New York: John Wiley & Sons, 1978.
- McGill University System for Interactive Computing at NTSU - Denton, Tex.: North Texas State University Computing Center, 1981.

- Morrow, George. Using OS/MVT - Denton, Tex.: North Texas State University Computing Center, 1982.
- SAS Institute - SAS User's Guide. Cary, N.C.: SAS Institute, Inc., 1979.

```

* * * * *
*           *
*   M U S I C   *
*           *
* * * * *

```

Class ID's Cancelled

All MUSIC ID-codes that were assigned for specific courses during Summer Session II, will expire Sunday August 22, 1982. Students are responsible for making a backup copy of their files, if necessary.

Renew Your ID-Code

All MUSIC ID-Codes (Faculty, Individual, and Research) will expire on September 30, 1982. MUSIC users must renew their ID-codes before that time. The renewal form should indicate the user's present MUSIC ID-code, a valid OS/MVT project number, and signature of a faculty member. No renewal form will be accepted before September 10, 1982.

Change That Password

"Gremlins" have upon occasion "cracked" the ID-codes of various MUSIC users, wreaking havoc upon their SAVE Library files. To prevent this disturbing situation from happening to you, it is necessary to take a few precautionary measures:

1. Keep your ID-code secret (i.e. memorize it, and don't let anyone look over your shoulder while you are logging-on).
2. Change your password immediately when you get a new ID-code. This is done by using the PROFILE utility (enter PROFILE HELP while logged-on to MUSIC, or consult the MUSIC at NTSU manual for further details).

3. Try to use a password that is not too obvious (your first name is obvious, so are your initials, your last name, etc.).
4. Change your password frequently if you have especially critical material stored in any of your files.

```
* * * * *
*           *
*   H P - 2 0 0 0   *
*           *
* * * * *
```

Editing BASIC Programs

When using HP EDITOR in the BASIC environment, you might notice that EDITOR does not provide you with the capability to execute your program. The solution to this problem is to bring your EDITOR workfile into the workspace outside of EDITOR so that you can RUN it to see if it is working properly and then return to EDITOR for more editing, if necessary. This can be done in the following manner:

1. Build an ASCII file of sufficient size to hold your EDITOR workfile using the command FILE.
2. Using FCOPY, copy your EDITOR workfile to this ASCII file.
3. Enter 'LOAD-' and the name of the ASCII file. This will bring the program into the workspace.

If you find that further editing is needed, it is best to return to EDITOR, make the necessary changes to the workfile, and then repeat steps 1 through 3. You can always, of course, NAME the program in the workspace, SAVE it, and proceed without EDITOR.

System Processing To Take Place August 28.

On Saturday, August 28, the HP will be shut down from 8 a.m. until approximately noon to facilitate end-of-semester processing and reporting. All classroom ID-codes assigned for Summer II will be deleted from the system at this time.

HP Short Course to be Offered

Be sure to check the information in this newsletter concerning the Computing Center Short Courses that will be offered for the beginning of the Fall semester. The course entitled 'An Introduction to the HP/2000' will provide the beginning HP user with a good overview of the capabilities of the HP/2000 System hardware and software so that he/she may decide if the HP/2000 suits his/her particular needs. Contact Jeff Brooks (565-3885) at the Computing Center if you would like any further information regarding the content of the course.

HP User's Guide to be Available Soon

The part of the NTSU Computer User's Guide dealing with the HP/2000 system at NTSU is currently nearing completion and should be available for purchase at the University Store early this Fall. 'Using the HP/2000' will include discussions of the available facilities, of computing policies, and of system capabilities. This guide is designed to give the user a comprehensive picture of the HP/2000 system so that he/she can evaluate its facility in comparison to the other computer systems at NTSU, and so that he/she can fully utilize the resources that the HP has to offer.

BENCHMARKS REVISITED: IMPORTANT ITEMS FROM THE PAST

The following is a comprehensive list of items that have appeared in BENCHMARKS since its inception (January 1980), and are still considered relevant.

GENERAL INFORMATION:

- The Computing Center is going through some changes, see:
 - a). "Report on Computing Facilities Planning" in BENCHMARKS, Volume 3 Number 5.
 - b). "Talking to the Computing Facilities" in BENCHMARKS, Volume 3 Number 5.
- A series of articles describing how to use the computer for research have been printed in BENCHMARKS, Volume 3, Numbers 2,3,4, and 5.
- A users guide to computing facilities is being compiled by the Academic Computing staff. One section, Part III: Using OS/MVT is available at the University Store at a cost of 95¢.

- Wondering about "the system"? "Exactly What is 'The System'" in BENCHMARKS Volume 3, Number 2, could provide you with some answers.
- Some references that could be quite valuable to anyone using statistical packages to analyze their data can be found in "Recommended References for Research". This article appeared in BENCHMARKS, Volume 3, Number 2.
- NTSU is a member of EDUNET, a national higher education computer network.. If you believe you have a problem which demands computing services not available here at NTSU, you should contact Tom Madron, Manager of Academic Computing Services at (817) (565-2324).
- An instructional slide/video presentation introducing the North Texas State Computing Center and it's facilities is available to anyone interested in making a presentation on the topic. For further information contact Academic Computing (817) 565-2324.
- A list of the representatives to the University Computing Council can be found in "Know Your Representative", BENCHMARKS, Volume 2, Number 6.
- Usage Statistics:
 - a) For the period September 1, 1980 to July 31, 1981 can be found in BENCHMARKS, Volume 2, Number 5, "AS/5000 Usage Statistics - September 1, 1980 to July 31, 1981."
 - b) For the Spring semester, 1980 can be found in "Usage Statistics for Spring 1980," BENCHMARKS, Volume 1, Number 2.
 - c) For Fall 1978 and Fall 1979 can be found in "Usage Statistics," BENCHMARKS, Volume 1, Number 1.
 - d) A graphic representation of MUSIC usage statistics between 1980 and 1981 is available in BENCHMARKS, Volume 3 Number 1.
- The Computing Center has two TI-745 Silent 700 terminals for use on a 24 hour basis for interested faculty members. To check out the terminals, faculty should call 565-2324 or come to the reception area of the Computing Center in the Information Science Building.
- The Computing Center currently has a master terminal maintenance contract with Percor Maintenance, Inc. Any department may issue a purchase order for departmental terminal maintenance and reference the master contract without going through another bid process. Contact Sandy Franklin in the Computing Center (565-2324) for further details and/or help with purchase orders.
- Users of the statistical packages should read "Stat Users Beware," BENCHMARKS, Volume 1, Number 2.

- "A Glimpse at the Past," in BENCHMARKS, Volume 1, Number 1, gives a brief history of the computing facilities available at NTSU from 1962 until 1980.

Services Available

- The Data Entry section of the Computing Center, located in ISB 227, will enter data directly into a user's MUSIC files. Users should:
 - a) Have a valid project number.
 - b) Have a MUSIC ID.
 - c) Have their data in a form that is acceptable to the Data Entry personnel.
 - d) Change their passwords before and after their data are entered.
- Data Entry will also interpret card decks, should you need this service.
- Pre-research counseling, including survey instrument design (for ease in data analysis) is provided as a service by the Computing Center for those graduate students and faculty members who have a valid project number.

Input/Output

- 800 BPI tape processing is being phased out. See "800 BPI Processing Coming to an End" in BENCHMARKS Volume 3, Number 3, for information on available alternatives.
- All jobs that request an excess of 512K must complete a special handling card and have it signed by a member of Academic Computing. This card must specify the amount of Main Storage and Elapsed Execution time, and must be delivered to the Main Console operator. Class L jobs (Jobs requesting more than 512K) will only be processed during periods of low activity - usually on third shift and weekends.
- It is possible to request special forms by coding the forms description on the JOB card. A complete description of this coding scheme can be found in "Revised Forms Description Guide," BENCHMARKS, Volume 2, Number 7.
- A TN text printing train is available and can be used to produce "letter quality" print. A table of characters that appear on this train can be found in "TN Print Train Available," BENCHMARKS, Volume 2, Number 7.
- "Guidelines For Tape Processing", in BENCHMARKS, Volume 2, Number 6, describes the proper procedure for using tape I/O.

- It is advisable to use the file disposition "share " (DISP=SHR) when reading a disk data set.
- Having trouble estimating how long your job will run? "Priority Setting for Batch Jobs," in BENCHMARKS, Volume 2, Number 4, discusses this topic thoroughly. The first estimated time in the table should be :05 instead of :20.
- A detailed description of the JOB card, can be found in "JOB Card Preparation," BENCHMARKS, Volume 2, Number 3.
- Data sets which reside on the disk packs here at NTSU should be named according to the following convention:

USERn.Dxxxx.Pyyyy.name

Where capital letters and periods must appear as shown:

n=1 for research users.

n=2 for instructional users.

xxxx=the first four digits of your project number.

yyyy=the last four digits of your project number.

name=one or more optional fields (each of which may not exceed eight

characters), separated by periods. THE TOTAL LENGTH OF THE DATA SET NAME MAY NOT EXCEED 44 CHARACTERS, INCLUDING THE FIRST THREE MANDATORY FIELDS AND ANY PERIODS.

- If you desire someone other than yourself to pick up a SECURE job, you must send a signed memo stating the name(s) of your representative(s) and any date restrictions upon them. This memo should be addressed to Lawana Freeman, Dispatch Job Coordinator.

Software:

- "Sorting Data Sets Efficiently" appeared in BENCHMARKS, Volume 2, Number 7, and describes the various sort routines available to users of the AS/5000.
- WATERLOO Script, a text processor from the University of Waterloo in Canada is available in batch mode. For more information about this processor, see "WATERLOO Script Available in Batch Mode," BENCHMARKS, Volume 2, Number 7. Please Note: The program to print the manuals, as described in the article, should be SCRIPTNN instead of SCRIPTM.
- A procedure called UTILITY is available which makes IEBGENER easier to use. UTILITY has been documented in BENCHMARKS at various times, the most comprehensive of which was in the article "New 'Utility' Procedure," in Volume 2, Number 4.
- To change the names of disk data sets located on ACAD00, ACAD01, or ACAD02:

```
//MYJOB JOB (xxxx-yyyy)
// EXEC IEHPROGM
// RENAME DSNAME=OLD.DATASET.NAME,VOL=SYSDA=XXXXXX, <col72>->C
NEWNAME=new.dataset.name
```

- You can use the IEFBR14 utility to delete unwanted disk files:

```
// EXEC PGM=IEFBR14
//DD1 DD DSN=USERn.Dxxxx.Pyyyy.name,VOL=SER=ACADnn,
// UNIT=SYSDA,DISP=(OLD,DELETE)
```

- The article "Behavioral and Social Science Data Analysis Using OSIRIS," by Dr. C. Neal Tate of the Political Science Department (BENCHMARKS, Volume 1, Number 2), is a good reference for people interested in finding out more about OSIRIS.

Hardware:

- "Using Micros as Terminals" in BENCHMARKS, Volume 2, Number 7, provides guidelines on setting up microcomputers to function effectively as terminals.
- A description of the four National Advanced Systems tape drives, and instructions for accessing them can be found in the article "New Tape Drives", BENCHMARKS, Volume 2, Number 6.
- For help on using the MIME-2A terminal, see "Helpful Hints on Using the MIME-2A," in BENCHMARKS, Volume 2, Number 5.
- For a complete description of the National Advanced Systems AS/5000 computer, see "Computer Acquisition Status Report," in BENCHMARKS, Volume 1, Number 2.

SPSS:

- Numerous articles on using SPSS MANOVA have been printed in BENCHMARKS, see:
 - a) "Technical Notes on Repeted Measures Designs in SPSS MANOVA", Volume 3, Number 5.
 - b) "Recurring MANOVA Problems", Volume 3, Number 5.
 - c) "Using the MANOVA Procedure for Various ANOVA Designs", Volume 3, Number 2.
 - d) "Undocumented MANOVA Conventions", Volume 3, Number 1.
- General information on the latest release of SPSS (9.1), which is the version currently being run here at NTSU, can be found in BENCHMARKS, Volume 3, Number 3. The articles are entitled:
 - a) "Release 9.1 Installed".

b) "Known Errors in SPSS Release 9.1".

- If you need to print extremely small numbers using SPSS, refer to "Printing 'Very,Very Small' Numbers" in BENCHMARKS, Volume 3, Number 1.
- "Manipulating 'Space' in SPSS", which appeared in BENCHMARKS, Volume 2, Number 7, discusses the concept of "space" and how to use it.
- "SPSS: Enlightenment" in BENCHMARKS, Volume 2, Number 7, provides some insights into SPSS as well as helpful hints.
- A copy of the SPSS Statistical Algorithms Manual is available for inspection from George Morrow in the Computing Center.
- Three approaches to analysis of variance are traditionally used when cell frequencies are unequal - the classic experimental approach, the regression approach, and the hierarchical approach. "ANOVA Models Tested by Various SPSS and SAS Options," in BENCHMARKS, Volume 2, Number 1, illustrates the model associated with each approach and the means to access each approach using either the SPSS ANOVA procedure or the SAS GLM procedure.

SAS:

- Recorded texts can be obtained, free of charge, for the visually impaired, by writing or calling: Recording for the Blind, Inc.; 215 East 58 Street; New York, NY 10022; (212) 751-0860.
- The RETAIN keyword should always be used in a SAS job that accesses a tape from more than one DATA step or PROC. For example:

```
//TAPE DD Vol=(,RETAIN,SER=nnnnn),UNIT=TAPE9,LABEL=(n,SL)
```
- PROC FREQ will only compute statistics for two-way tables.
- The only homogeneity of variance statistics that are found in SAS are:
 - a) The F (folded) statistic computed by PROC TTEST.
 - b) Bartlett's test in PROC TABLES (described in the SAS Institute Technical Report 1-120x, February 1, 1981).
- If you have a lot of OS data sets with the same format to be read into a SAS program, you should concatenate them in the JCL and use one INFILE statement to read them into SAS. The article "Using Multiple INFILE Statements" in BENCHMARKS, Volume 3, Number 1, has an example of this.
- When using PROC FORECAST (described in the SAS/ETS User's Guide), if you have fewer than 30 observations, you should use

the EXPO method rather than the STEPAP method to generate forecasts from time series data.

- A Computer assisted instruction (CAI) module is available on MUSIC through IIS for SAS. This module is designed to teach new users with limited computer and/or statistical expertise about SAS. To access this module, it is necessary to:
 - a) Get a MUSIC ID - available from the Computing Center, or use the MUSIC demonstration ID: LA00
 - b) Sign-On to MUSIC on a HARDCOPY terminal and enter:
SAS1.BOOKLET
At this point, the system will respond:
MUSIC/SCRIPT. . .ENTER OPTIONS OR 'HELP'
Press the <RETURN> or <ENTER> key and continue printing the booklet.
 - c) Sign-off of MUSIC on the hardcopy terminal and sign on at a CRT.
 - d) After logging on, enter: SAS1.LEARN
Then enter: STUDENT/SAS1
At this point you are in the SAS1 course, where further instructions will be given.
- The current version of SAS is 79.5. For a list of most of the procedures in this version of SAS, refer to "SAS 79.5 and ETS," BENCHMARKS, Volume 2, Number 5.
- The proceedings of the Sixth Annual SAS User's Group International (SUGI) Conference, held February 8-11, 1981, are available for examination, upon request, from Claudia Putnam, in the Computing Center.
- Additional explanation of Type I, II, III, and IV matrices can be found in A User's Guide to SAS 76, appendix 9. A copy of this appendix is available, upon request, from Claudia Putnam.

BMDP

- "Notes on PROC BMDP IN SAS" in BENCHMARKS, Volume 3, Number 3, discusses converting a SAS file to a BMDP file.

MUSIC

- Save Libraries can be maintained on MUSIC more efficiently by using the CAT utility and a little creativity. See "Library Maintenance on MUSIC" in BENCHMARKS, Volume 3, Number 5 and "CAT: an Additional Way to Browse Your SAVE Library Files," in BENCHMARKS, Volume 2, Number 6.

- Jobs can now be routed from OS/MVT to MUSIC by including the following card somewhere in your card deck:

```
/*ROUTE PRINT MUSIC
<PUNCH>
```

The first four characters of the JOBNAME should be the same as the MUSIC ID-code that the print/punch is being sent to.
- "How to Deal With Characters Not on Your Terminal" in BENCHMARKS, Volume 3, Number 5, suggests some ways to deal with this problem.
- Information about interfacing microcomputers with MUSIC can be found in the article "Microcomputer Software on MUSIC" in BENCHMARKS, Volume 3, Number 4.
- Confused about MUSIC files? See "What is a MUSIC File" and "The File Concept: What's the Difference" in BENCHMARKS, Volume 3, Number 3 for further information.
- Enter PASCAL.DOC while logged-on to MUSIC for on-line documentation for Stanford PASCAL.
- A utility, called #SET, is available to facilitate changing attributes of SAVE Library files in a user's SAVE Library. A complete description of this utility can be accessed by entering HELP #SET while logged on to MUSIC, or reading the article "Setting the Attributes of Your SAVE Library" in BENCHMARKS, Volume 3, Number 1.
- Help on many different topics may be obtained by entering the keyword HELP while logged-on to MUSIC. There are two different HELP facilities, one under Command (*Go) Mode, and one in Edit Mode. To get a list of topics available in Command Mode, enter HELP TOPICS. More information about the HELP facility is available in the MUSIC at NTSU Manual.
- A variety of sorting facilities are available on MUSIC, the most general of which is MNSORT. Refer to the "Sort Routines" section of the MUSIC at NTSU Manual, for more detailed information.
- The #EXCHANGE utility is available to help MUSIC users to archive (dump) their MUSIC SAVE LIBRARY files to OS/MVT disk packs and/or tape, later restore the files with minimum effort, and free the space quota assigned to their ID-codes for more frequently used programs. To read and/or print the documentation of this utility, type: #EXCHANGE.DOC

The <RETURN> key should be pressed when MUSIC responds with the message: ... Enter Options or HELP. If you enter HELP #EXCHANGE while logged-on to MUSIC, you can also get information about the #EXCHANGE utility. Finally, the article "#EXCHANGE: a New MUSIC Utility to Archive SAVE Library Files," can be found in BENCHMARKS, Volume 2, Number 6.

- The current version of MUSIC is Version 5. Version 5 MUSIC Manuals, MUSIC at NTSU are on sale at the University Store for \$8.75. The MUSIC/SCRIPT Manual is also on sale at the University Store for \$3.35. Pocket cards for MUSIC and MUSIC/SCRIPT may be purchased from the University Store for 50¢ a piece.
- MUSIC writes files which take up space on user ID's and appear as members in SAVE Libraries with an @ in front of the name. If this becomes a problem, i.e. lack of space, these files can be PURGED by the user. This should be done with a fair amount of caution, however, lest the user end up losing something (s)he really wanted to keep.
- When using SCRIPT, if you request your output be directed to a SAVE Library file rather than the terminal, the following occurs:
 - a) If the /FILE card is for Unit 6, SCRIPT operates correctly.
 - b) If the /FILE is for any other unit, then only the first eighty bytes of the output are placed in the file.
- The following terminal types are currently supported: TTY LA36 ACTV MIME ADM3A TI745 TI735 TRS80III TRS80II LA120 DIABLO
- A computer assisted test construction program, TESTER, is available under MUSIC. A copy of the Tester Manual may be printed on a hardcopy terminal by logging-on to MUSIC and executing TESTER.DOC. In addition to obtaining documentation on TESTER, it is also necessary for a potential TESTER user to contact Mohamad Salahshoor, the MUSIC Time-Share Coordinator, prior to executing any TESTER programs. This is necessary, because attributes must be given to a TESTER user's ID-code that are not normally enabled.
- An electronic mail system is available on MUSIC, and is documented in the article "Electronic Mail System Revisited," BENCHMARKS, Volume 2, Number 4. A user may also obtain information about this mail system, when logged-on to MUSIC, by entering HELP MAIL.
- It is sometimes necessary and/or expedient to capture output from OSJR. This can be done by using the FILE statement. For a complete description of this, see "Capturing Output From OSJR," in BENCHMARKS, Volume 2, Number 4.
- Several Computer Assisted Instruction (CAI) facilities are available on MUSIC. For a description of these refer to:
 - a) "Additional CAI Available Through MUSIC," in BENCHMARKS, Volume 2, Number 4, or log-on to MUSIC and enter HELP TEACH.

b) "Learning To Use MUSIC," BENCHMARKS, Volume 2, Number 3, or log-on to MUSIC and enter HELP LEARN.

- When entering text to be processed using MUSIC/SCRIPT, a // entered beginning in column 1 (while in /INPUT mode) will cause the entire line of the text to be capitalized. The only solution to this seems to be to avoid entering a // beginning in column 1. This could be accomplished by either preceding the // with a blank or embedding the // in text by moving text from the previous line to start in column 1.
- MUSIC backup is done daily, Monday through Friday at 4 AM; Saturday and Sunday it is done at 11:30 PM, just before the system is shut down.
- General features of most of the terminals around campus are described in the article "General Terminal Features," BENCHMARKS, Volume 2, Number 3.
- If you enter the PROFILE command and any options on the same line, separated by commas, the options will be executed and you will be automatically returned to *GO mode.
- Leaving off the sequence numbers of card image MUSIC files will save at least 25 percent of the space used to store the file.
- All users of TELEX terminals should post the TELEX Customer Service phone numbers next to their terminals so that they may report any terminal problems directly to the TELEX Service Company. The toll free number is : 1 - 800 -331 - 7410.
- To send output to a high speed printer or punch when using the OSJR facility of MUSIC, one should issue the following command:

ROUTE jobname,TO='destination'

Possible destinations are:

TO='LOCAL'	Computing Center Dispatch. This is the default if the keyword "TO" is omitted.
TO='BA'	Business Administration Remote Job Entry Station.
TO='SPECIAL'	Computing Center main printer, mainly used for special forms and print train.

NOTE: All punched output must be routed to 'LOCAL' or 'SPECIAL' since the BA RJE does not have a card punch.

- You can use the MUSIC utility PTPCH to obtain a hardcopy listing of a MUSIC Save Library file. Full documentation on this utility may be obtained by entering PTPCH HELP while logged-on to MUSIC.

- Attempting to key before the system prompts you (normally with a ?) will frequently put you in BREAK mode. Your next entry may produce the message:
 *ENTER BREAK-TIME COMMAND (OR BLANK LINE TO CONTINUE)
 Simply press the <RETURN> key in order to resume where you left off.
- Tabs will not work properly unless terminal type has been specified at log-on time. The BACKSP, ITABS, OTABS, and TAB options are all defined for a single specific terminal type. MUSIC checks the terminal type to make sure that the settings are valid for the terminal type in use. Tabs are set by executing the PROFILE program, however the user must log-off before they become valid. Enter PROFILE HELP for more information on this program.
- Entering the keyword NAME while in EDIT mode will remind you of the name of the file you are editing.
- All jobs submitted through OSJE and not routed to some output device within 24 hours of their execution will be cancelled.
- Always make sure and check the date of the latest NEWS message at the time you log-on. Very important messages will be labelled HOT!!!
- It is a good idea to have a naming scheme for your SAVE Library files. For a detailed discussion of this topic, refer to "Management of MUSIC SAVE Library Files," BENCHMARKS, Volume 2, Number 1.

HP-2000

- A demonstration ID is now available on the HP. It can be accessed by typing: HELLO-A098,PGREEN on a terminal connected to the HP. The password, PGREEN, should be typed without holding down the Control <CTL> key.
- An article, "A900 Pseudo-System Library", in BENCHMARKS Volume 3, Number 5 describes the A900 user contributed library. Type EXEC DQCPRT.A900 to get documentation on the programs, and type EXEC-programname.A900 to execute any of the programs.
- To check on the status of your HP account you can:
 - a) EXEcute-EXPIRE.A900
 This will tell you when the ID-code to which you are logged on to will expire.
 - b) Enter the keyword LEN to find out how much disk space has been used on the account you are logged on to.

- c) Enter the keyword TIM to find out the amount of terminal time your account has used.
- A detailed description of logging-on to the HP-2000 is contained in the article "Getting Started on the HP," BENCHMARKS, Volume 2, Number 4. Please note the the telephone number has been changed (see page 2 of this newsletter).

```

* * * * *
*               *
*   COMPUTER HUMOR   *
*               *
* * * * *

```

More Babbage

Last month's BENCHMARKS contained a synopsis of "Babbage: Language of the Future," which appeared in DATAMATION in 1981, and offered some extensions to it. This month's computer humor section contains even more extensions to this language of languages. Lee Harper, CSCI senior and part-time worker in Operations, has submitted the following suggestions:

Being the ultimate language, BABBAGE should most definately contain many macros, commands, and pseudo-subroutines. Some of my suggestions follow:

- WARPSORT - subroutine which sorts alphabetic or numeric data in ascending, descending, reverse, size, shape, color, or definition order. The sort takes no CPU time, and in fact will credit your account number with up to an extra hour of instruction-cycle time.
- LLD - (Live and Let Die) macro accompanying a job will avert any system or operator cancel command to another job.
- Another Case:
 - SUIT CASE - allows use of case with packed data.
- More loop commands:
 - DO-DAH - allows loops up to five miles long (as in Camptown Race-track).
 - DO-DO - creates a dump of loop contents.
- Some Branch commands:

- GOFORIT - no branch taken, but boosts the computer's ego.

MAGIC*, a procedure, written in BABBAGE, is now available which automatically improves the efficiency of an activity which does not normally produce the desired results. Great care should be observed in the use of this procedure, as indiscriminate use may cause the system to become self-regenerative and creative. The EXEC statement for MAGIC is:

```
// EXEC MAGIC option,option,option
```

The following options are available in the variable field. There are no default options.

- language1/language2 - Causes a source program written in a specified language1 to be converted to the specified language2. Language1 and language2 must be the names of compilers currently available on the system.
- CLEANUP - Causes automatic debugging of a source program.
- CONVER/system - Causes automatic compilation of a program which has been written for the specified "system."
- NOSTOP - Insures that the job will be completed before the system goes down in the event of hardware failure.
- SHRINK(size) - Automatically reduces core utilization to the size specified.
- SPEEDUP(time) - Automatically causes the job to run faster than the time specified. Time is specified in hundredths of an hour.
- TESTDATA - Causes automatic generation of test data for testing a user program.

EXAMPLE

```
//jobname JOB acct-int
//step1 EXEC MAGIC FORTRAN/COBOL,CLEANUP,NOSTOP,SPEEDUP(10)
//      SHRINK(4K),TESTDATA
      .
      .
      FORTRAN SOURCE
      .
      .
//
```

We can still add on to Babbage. In case any of you can think of any more enhancements please send a memo to Claudia Putnam (FA14) while signed-on to MUSIC, or through inter-campus mail.

*Adapted from an article that appeared in the UTA LINK, July 1982.

REGISTRATION FORM FOR COMPUTING CENTER SHORT COURSES

Please complete this form and return it AS SOON AS POSSIBLE if you wish to attend any of the short courses announced in this issue.

NAME: _____ DEPARTMENT: _____

PHONE: _____

I wish to attend :

Introduction to Computing Center Facilities <WH 322>	-- September 20, 1-3 PM
Introduction to MUSIC <WH 222>	-- September 20, 3-5 PM
Introduction to HP/2000 <WH 222>	-- September 21, 3-5 PM
Introduction to SAS <WH 216>	-- September 21/23 3-5 PM
Introduction to SPSS <WH 212>	-- September 21/23, 7-9 PM
Explaining the NTSU Test Scoring Program (ST033) <WH 322>	-- September 22, 1-3 PM
Introduction to MUSIC/SCRIPT <WH 222>	-- September 22, 3-5 PM
Advanced Topics in MUSIC <WH 322>	-- September 23, 1-3 PM
Advanced Statistical Packages <WH 322>	-- September 24, 3-5 PM

PLEASE RETURN TO:

Academic Computing Services
The Computing Center
NT Box 13495
North Texas State University
Denton, TX 76203

GET A "SUBSCRIPTION" TO BENCHMARKS

BENCHMARKS is a vital link between the NTSU Computing Center and the users of our facilities. It is important for all users of the computing facilities to maintain a file of these newsletters because they contain materials which will periodically update existing documents as well as information and suggestions on uses of OS-MVT, MUSIC, the HP-2000, and other resources available to NTSU students and faculty. To facilitate the dispersal of BENCHMARKS, *** FREE *** subscriptions are now available. To receive yours, send the following information to us either by "snail mail" (the post office or campus mail) or electronically, through the MAIL facility on MUSIC.

Name _____

Mailing Address _____

PLEASE GIVE A CAMPUS ADDRESS (NOT BOX) IF POSSIBLE - It's Cheaper !

PLEASE RETURN TO:

Academic Computing Services
The Computing Center
NT Box 13495
North Texas State University
Denton, TX 76203

